Research on the Impacts to Bees from Electromagnetic Radiation

Electromagnetic fields from power lines, cell phones, cell towers and wireless has been shown to negatively impact pollinators, bees and our environment in numerous peer reviewed research studies.

Research has found electromagnetic radiation can alter bee behavior, induce biochemical changes and impact bee reproduction.

SUMMARY

- Experimental studies by Favre 2017 found exposed bees exhibited behaviors naturally produced by disturbed honeybees and the authors concluded that "The present data strongly suggest that honeybee colonies are affected and disturbed by electromagnetic waves (RF-EMF)."
- Ulrich Warnke's review article cites multiple studies and posits that electrical, magnetic and electromagnetic fields disrupt the orientation and navigation of many birds and pollinators.
- Published research has found a myriad of effects after electromagnetic radiation exposure including inducing artificial worker piping (Favre, 2011), disrupting navigation abilities (Goldsworthy, 2009; Sainudeen, 2011; Kimmel et al., 2007) decreasing rate egg laying rate (Sharma and Kumar, 2010) and reducing colony strength (Sharma and Kumar, 2010; Harst et al., 2006). Neelima Kumar and colleagues (2011) found cell phone radiation influences honey bees' behavior and physiology.

CONCLUSION

As Clarke et al. (2013) has reported, bees have a particular sensory modality allowing them to detect electric fields, and thus they are particularly susceptible to large amounts of electromagnetic radiation.

Colony Collapse Disorder may be caused by a combination of several factors including pesticides, chemicals and parasitic infection. Researchers are proposing that the stress of increasing electromagnetic radiation exposure has stressed and weakened bee populations which results in bee's decreased ability to maintain their health when also exposed to increased pesticides, chemicals and infections. The bee's resistance to environmental stressors is weakened by EMF exposure.

NEWS ARTICLES

Herriman, Sasha. "Study links bee decline to cell phones." *CNN* (30 June 2010).

Chokshi, Niraj. "If Cell Phones Are Behind the Bee Decline, What Are They Doing to Humans?" The Atalantic (30 June 2010).

- "In a study at Panjab University in Chandigarh, northern India, researchers fitted cell phones to a hive and powered them up for two fifteen-minute periods each day. After three months, they found the bees stopped producing honey, egg production by the queen bee halved, and the size of the hive dramatically reduced."
- "Andrew Goldsworthy, a biologist from Imperial College, London, told CNN that the reason may have to do with radiation from cell phones and cell towers disturbing the molecules of the chemical cryptochrome, which bees and other animals use for navigation."

Derbyshire, David. "Why a mobile phone ring may make bees buzz off: Insects infuriated by handset signals." Daily Mail (13 May 2011).

- After phones were activated, the bees emitted "piping" calls –announce the start of swarming.

SCIENCE

Balmori, Alfonso. "Anthropogenic radiofrequency electromagnetic fields as an emerging threat to wildlife orientation." Science of The Total Environment, vol. 518–519, 2015, pp. 58–60

- Radio frequency noise interferes with the primary process of magnetoreception. Existing guidelines do not adequately protect wildlife. Further research in this area is urgent.

Cucurachi, C., et al. "A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF)." Environment International, vol. 51, 2013, pp. 116–40.

- A review of 113 studies found RF-EMF had a significant effect on birds, insects, plants and other organisms in 70% of the studies. Development of birds and insects are most strongly affected.

Goldsworthy, Andrew. "The Birds, the Bees and Electromagnetic Pollution: How electromagnetic fields can disrupt both solar and magnetic bee navigation and reduce immunity to disease all in one go." 2009.

- Documentation of the increasing evidence that disappearing birds and bees is partially due to electromagnetic pollution from cell towers, cell phones, DECT cordless phones and Wifi. "It appears capable of interfering with their navigation systems and also their circadian rhythms, which in turn reduces their resistance to disease. The most probable reason is that these animals use a group of magnetically-sensitive substances called cryptochromes for magnetic and solar navigation and also to control the activity of their immune systems."

Kumar, Neelima R., Sonika Sangwan, and Pooja Badotra. "Exposure to cell phone radiations produces biochemical changes in worker honey bees." Toxicol Int., 18, no. 1, 2011, pp. 70–2.

Favre, Daniel. "Mobile phone induced honeybee worker piping." Apidologie, vol. 42, 2011, pp. 270-9.

Harst, Wolfgang, Jochen Kuhn and Hermann Stever. "Can Electromagnetic Exposure Cause a Change in Behaviour? Studying Possible Non-thermal Influences on Honey Bees – An Approach Within the Framework of Educational Informatics." Acta Systemica-IIAS International Journal 6.1 (2006): 1-6.

Kimmel, Stefan, et al. "Electromagnetic radiation: influences on honeybees (Apis mellifera)." IIAS-InterSymp Conference (2007).

"Briefing Paper on the Need for Research into the Cumulative Impacts of Communication Towers on Migratory Birds and Other Wildlife in the United States." Division of Migratory Bird Management (DMBM), U.S. Fish & Wildlife Service, 2009.

Sharma, V.P. and N.K. Kumar. "Changes in honeybee behaviour and biology under the influence of cellphone radiations." Current Science 98.10 (2010): 1376-8.

Greggers, Uwe, et al. "Reception and learning of electric fields in bees." Proceedings of the Royal (2013).

Shepherd et al., Extremely Low Frequency Electromagnetic Fields impair the Cognitive and Motor Abilities of Honey Bees, Scientific Reports volume 8, Article number: 7932 (2018)

Thielens et al., "Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz" Scientific Reports volume 8, Article number: 3924 (2018)

Cammaerts, Marie-Claire. "Is electromagnetism one of the causes of the CCD? A work plan for testing this hypothesis." Journal of Behavior, vol. 2, no. 1, 2017, pp. 1006.